

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

**POND SEALING OR LINING - FLEXIBLE MEMBRANE
(NO.)
CODE: 521A**

DEFINITION

A manufactured hydraulic barrier consisting of a functionally continuous sheet of synthetic or partially synthetic, flexible material.

PURPOSE

To control seepage from water and waste impoundments for water conservation and environmental protection.

CONDITION WHERE PRACTICE APPLIES

On ponds and water storage structures that require treatment to control seepage rates within acceptable limits.

On waste storage and waste treatment facilities built in or of excavated earth, and which require treatment to prevent the migration of contaminants from the site.

CRITERIA

Structures to be lined shall have been constructed to meet all applicable NRCS standards. All inlets, outlets, ramps, and other appurtenances may be installed before, during, or after the liner placement, but shall be done in a manner that does not damage or impair the proper operation of the liner.

All flexible membranes shall be certified by the manufacturer to be suitable for the intended use.

Design of the flexible membrane shall be in accordance with manufacturer recommendations. All flexible membrane installations shall meet the material and installation requirements of the plans and specifications provided for each installation. Upon completion of liner installation, the contractor shall provide a letter stating that the liner was installed according to the plans and specifications and the manufacturer's recommendations.

| Minimum Criteria for Membranes | |
|--------------------------------|------------------------------|
| Type | Limiting Parameter |
| HDPE | 40 mil thickness |
| VFPE | 40 mil thickness |
| PVC | 30 mil thickness |
| GCL | 0.75 lb./sq. ft. (bentonite) |
| EPDM | 45 mil thickness |

HDPE = High Density Polyethylene

VFPE = Very Flexible Polyethylene, includes:

LLDPE (Linear Low Density Polyethylene)

LDLPE (Low Density Linear Polyethylene)

VLDPE (Very Low Density Polyethylene)

LDPE (Low Density Polyethylene)

PVC = Polyvinyl Chloride

GCL = Geosynthetic Clay Liner

EPDM = Synthetic Rubber

Select soil materials shall be used as cover for liners where required for the proper performance, protection, and durability of the installation. Cover soils shall not contain sharp, angular stones or any objects that could damage the liner. Maximum allowable particle size of soil cover material shall be 3/8-in (10 mm), unless the liner is cushioned by a needle punched, non-woven geotextile. Cover materials shall be stable under all operational and exposure conditions. Side slopes shall not be steeper than 3H:1V when a cover material is used.

Cover soils on GCLs shall be designed to either prevent or accommodate side slope erosion in order to maintain the required confining pressure on the GCL.

Subgrade preparation shall conform to manufacturer recommendations. Subgrade materials shall not contain sharp, angular stones or any objects that could damage the liner or adversely impact its function.

NRCS-Minnesota
May 2000

All structures shall be fenced to protect the liner from damage and for the safety of humans, livestock, wildlife, and pets.

Manufacturer recommendations shall be followed with regard to protection from weather and exposure.

Venting shall be provided if gas build up is anticipated under HDPE, VFPE, PVC or EPDM liners. Gas build up may occur when a membrane is installed over soils with high organic content. The design of the venting system, including type and extent of the vents and pond bottom grading details, shall be as recommended by the manufacturer.

Safety. A means of egress shall be provided on ponds with flexible membrane liners without soil cover.

CONSIDERATIONS

If high water tables could adversely affect the proper functioning of the facility, interceptor or relief type drainage systems should be considered to control uplift pressures.

PLANS AND SPECIFICATIONS

Plans and specifications shall be prepared for specific field sites in accordance with this standard and shall describe the requirements for applying the practice to achieve its intended uses.

OPERATION AND MAINTENANCE

A plan for operation and maintenance of the liner shall be prepared.